A near zero consumption building as an urban acupuncture for a vertical slum. A case study in the city of Malaga, Spain.

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Abstract.

A vertical slum is defined as a socially vulnerable community in a building, with serious problems of functionality, safety and habitability. It is related with an important level of physical degradation, and a precarious socioeconomic situation of its occupants. Their inability to create a real community for proper and mandatory maintenance increases the physical deterioration of the building. The abandonment of the original owners of the houses can cause a system of illegal occupation and illegal activities, and viceversa. In many cases, the new occupants are the main interested in maintaining the building in a state of precariousness in order to avoid any attemp of renovation. These security and habitability problems often extend outside the building and they affect a whole community of neighbors within the neighborhood who feel threatened and insecure, causing their rejection and a strong social segregation in the area.

This article wants to show some of the results from a research work developed on a case study of vertical slum in the city of Malaga, in Spain. In this context of marginality previously described, the research project explores different alternatives for the renovation of a building, its vulnerable community and the neighbourhood in which it is inserted. The project stablishes four major objectives: (a) a physical renovation of the building, (b) social transformation in a disadvantaged environment, (c) functional evolution-from a residential model to a new hybrid model with a mixed supply of social services, and (d) the incorporation of new parameters of environmental sustainability that improve the energetic behavior of the building (transforming it into a building of almost zero consumption).

The research closes with a series of strategies and results for the case study. However, the main contribution of the work is related to the research methodology that has been developed. This is structured according to the four principles of integrated urban renovation, based on a physical, social, economic and environmental perspective. This methodology and results have been explained so that they can be transferred to other areas and experiences of urban recycling in vulnerable social environments.

1. Introduction

After almost a decade of economic recession in the international sphere, and with profound consequences in the Spanish economy and society, the need for extensive growth of cities has been questioned. Spain has one of the largest housing estates among all the countries of northern Europe, as shown by Rodríguez Alonso [1]. However, only 70% of the homes are occupied and one third of the houses are underutilized. The intense construction of the last years before the crisis, the creation of infrastructures and the excessive growth of cities has led to consume much more land than it is necessary in our country. Reflection on models for the cities is absolutely necessary.

In recent years new concerns have arisen around the existing city which suffers from some specific problems. *Ciudadviva.org* platform has published several research works on the concept of inner city growth and the challenge of urban obsolescence in the contemporary city. It is necessary to attend to areas with physical problems (inadequate architectural types, poor technical equipment, physical deterioration), urban problems (isolation of slums, functional deficiencies, degradation of public space and the urban landscape), and those related with heritage and social conditions (educational disadvantages, segregation, insecurity and other conflicts) [2].

Martín - Consuegra, Alonso and Frutos [3] focus on the concept of integrated urban regeneration based on a transverse approach in terms of environmental, social and economic integration, as shown in the *Declaration of Toledo* document (adopted in June 2010). It addresses urban challenges from the context of the economic crisis in Europe and in line with the objectives of the European 2020 strategy. From the environmental point of view, some targets for the reduction of gas emissions are established. These are focused on the fields of transport, energy efficiency in buildings, management of energy flows, consumption at the local level, recycling of soil or protection of natural resources. From the social point of view, attention is focused on the problems of employment, school drop-out or poverty that affect a large part of the population, and the importance of incorporating policies that guarantee access to decent and affordable housing. From the economic point of view, the I+D+i and employment boost become key aspects for the regeneration of the economy. The architectural and urban renovation are indicated as areas of work and opportunity where the public space acquires a fundamental role as place of encounters and relationships between people.

Based on this holistic and integrated approach, urban regeneration projects require the collaborative work of different professionals such as architects, engineers, economists and social professionals [4] as well as the elaboration of integrative methodologies of all the disciplines involved, administrations and agents. The concept of governance acquires a special importance in regeneration urban processes, considered as a necessary instrument for the interaction between administrations among themselves and with private institutions and initiatives.

The Special Plan for the Renovation of La Mina neighborhood in Barcelona (National Urbanism Award 2006 granted by the Ministry of Housing of the Government of Spain) is a benchmark within the policies of urban renovation in Spain [5]. The transformation process carried out in the neighborhood includes different perspectives and complementary actions. On the one hand, it includes the renovation of the existing building and regeneration of the public space. On the other hand, this renovation is accompanied by a transformation of new uses, facilities and a complete program of social actions, which ensure the success of physical and infrastructural investments. It could be said that the center of the conflict in the neighborhood was clearly social, beyond urban problems. For this reason, the research enhances the importance of social project in the process of urban regeneration. In the words of López de Lucio [6], this is an authentic "complex action" initiative on the consolidated city that surpasses simplistic approaches based on façades and pavement renovation.

Some of the key aspects already advanced in the Catalan project affect the need to promote social diversity within the local community, trying to eliminate the ghetto or social segregation that until now prevailed in the neighborhood. Jane Jacobs in her book “Death and Life of the Great American Cities” [7] offers some clues to foster this diversity, including a mix of uses and basic functions in the neighborhoods. Hybrid models have been used in urban regeneration projects as a resource to promote the compact city, as well as a strategy for an active and diverse life in urban area. The project of the De Rokade tower and the residence Maartenshof responds to the program "The intense City" launched by the Municipal Council of Groningen to increase the density in the districts of the city center [8]. The project consists of a nursing home (geriatric residence, protected rental apartments and a nursery) and an apartment tower for elderly people. In this way, the mix of different uses and programs in the same building allows to meet diverse needs, social and housing demands.

The proposed case study is a community of neighbors within a building with serious problems of functionality, security and habitability. As in the case of the Barcelona project, beyond the architectural problem of physical degradation, the center of the conflict in the building is a social cestion, with a very precarious socioeconomic situation of its occupants, exacerbated by a series of illegal practices and occupation of the building. Their inability to create a community for proper and mandatory maintenance increases the building’s physical deterioration. The abandonment of the original owners gives way to a system of illegal occupation and illegal activities, and viceversa. In many cases, the new occupants are the main interested in maintaining the building in a state of precariousness, thus canceling any attempt for its renovation. These problems of security and habitability extend, in many cases, outside the building, and affect a whole community of neighbors, within the neighborhood, who feels threatened and insecure, provoking their rejection of the building environment and a strong social segregation.

2. Case study. Research’s background

Málaga City Council is carrying out a comprehensive housing renovation project in the La Palma-Palmilla neighborhood, one of the most disadvantaged areas in the city of Málaga, with problems of social cohesion, delinquency and a high percentage of school failure among the younger people [9]. The building is located in this neighborhood, although it offers a very differentiated situation with respect to the other blocks of the environment, due to its serious physical deterioration and its basic facilities, caused, among others, by the socio-economic problems of its Owners and occupants, arriving in many cases to situations of marginality.

One of the biggest problems of the building, with 53 houses distributed in 13 floors, is the lack of universal accessibility. Since 1990 there is no elevator, and although there was an attempt to install one, it only worked for a short period of time, becoming after that, a hollow for the accumulation of garbage, with the consequent sanitary risk. The collection of rubbish and furniture used in the common areas is also a risk factor against fire, and specifically in 2004 there was a fire that caused serious burns to a tenant. In 2007, due to the intervention of the municipal administration, the room of electricity meters had been repaired, which had burned down years ago, causing a lack of electricity supply in the building since 2005.

This building of flats was promoted by the old *National Housing Institute*; the tenants of housing would be the owners of these when finishing the total payment. In 2008, only a small proportion of the occupants were the owners of the flats, due to the majority of the original contractors had left the building because of the deplorable conditions in which it was located. The result of this has been the proliferation of irregular occupations of the houses and illegal activities. This situation of unregulated occupations and illegal rents makes difficult or even impossible the renovation works that are necessary to ensure the habitability conditions of the building.

For all this, in 2008, the Ministry of Housing and Territorial Planning of the Andalusian Government started the expropriation process of the property, existing the cause of public utility or social interest, according to Law 13/2005 of 11 Measures for Protected Housing and Land. In May 2009 the renovation of building started by the neighbors themselves; a few months later, a community of owners was established, fixing expenses of 10 euros per month, which in most cases, is not even possible to pay. The building has still serious problems of habitability, both in the common areas as in most of the houses.

In 2010, a new approach was proposed through the Project called "Hogar Project", based on the Participatory Action Research model, with the intention of resuming, streamlining and resolving most of the conflicts that the neighbors of these neighborhoods suffer: economic factors, social issues and exclusion. The main objective of this plan is to develop an Integral Plan for the area Palma-Palmilla that is managed by the neighbors. It should include all the necessary actions to transform the life of the neighborhoods and improve the conditions in which they live.

However, the special conditions of the building require, within the framework of the "Home Project", the development of a management model with the intervention of the public administration. In this sense, the institute Habitat, Tourism and Territory from the University of Malaga has previously investigated new management models, focusing on the renovations of neighborhoods based on the provision of housing services. The idea of these housing services is to pay for them under a common property or public ownership regime. These conditions are very different from traditional renovation based on the direct subsidy of the services by the administration, but where the maintenance rests in the private ownership, also responsible for its maintenance. One of the main problems of the building is related to the incapacity of its community to maintain, update and manage the building in minimum conditions of habitability and security.

3. Objectives and methodology

In this context of marginality previously described in the existing building, and trying to promote an urban and social regeneration in the whole neighborhood, the research work establishes, as its main objective, to explore different alternatives for the renovation of the building and the area in which it is located. Specifically, the following specific objectives are established:

- Analysis of urban, architectural and social conditions
- Approach to a hybrid model for the provision of social and housing services, and
- To advance a series of physical, social and environmental regeneration guidelines.

The research is built around 4 complementary lines of work based on the idea of integrated regeneration: physical renovation of the building, social transformation of a clearly disadvantaged environment, functional evolution - from a residential model to new hybrid models with a mixed supply of social and housing services-, and the incorporation of new parameters of environmental sustainability that improve the energy performance of the building. The project closes with a series of strategies and results for the case study. However, the main contribution of the work is related to the research methodology that has been developed. This is based on a rigorous basic research and an integrated approach from the urban, architectural and social in its different phases:

1st phase: Previous studies: urban, architectural and social analysis.
2nd phase: Approach to different hybrid models in the building for the provision of social services, facilities and housing services.
3rd phase: Guidelines and strategies for Integrated Regeneration.

4. Results. Phases and discussion

4.1 Preliminary studies: urban, architectural and social analysis

Although the study focuses on a specific building, it is necessary to study the needs of the environment in which it locates, both urban and social demands to offer a series of services that improve the quality of the neighborhood. The three baseline studies are defined as follows:

4.1.1 Urban Studies

They include, in addition to a conventional urban planning information, an environmental assessment of the neighborhood based on the methodology developed in the research project "Carretera de Cadiz neighborhoods in Malaga: towards a sustainable model of urban and architectural integrated renovation" [10]. In this methodology, a series of sustainability indicators were used and adapted from the analytical approaches of the project "Eco city and its manual for the design of eco-cities in Europe" [11] and the design criteria for sustainable residential areas of Lopez de Lucio [12]. These urban studies carry out a diagnosis in which it is highlighted a low quality of the existing public space, a lack of relationships of neighbors, the need to reduce motorized traffic and to promote pedestrian areas in the neighborhood.

4.1.2 Architectural Technical Studies.

These include the current state of the building, its structural security, thermal and acoustic conditions, the state of its façades and roofs, accessibility and state of common areas. They also include a study of solar conditions, which allows, in case of future renovation, to improve its energy performance. The technical studies close with a diagnosis about the lack of sanitary conditions, safety and the serious deficiencies in the living conditions of the building. It presents continuous damages in common areas, illegal hooks to the supplies with situations of serious risk, houses in bad state, needs of renovation, and a lack of cleaning and hygiene that produces unhealthy situations. All this, in addition with socio-economic situation of its occupants, caused a particularly vulnerable building. The renovation of the building must be accompanied by a formula that guarantees the adequate and compulsory maintenance of the building.

4. 1.3 Social Studies

These studies include an approximation to the social situation of the occupants of the building, and at the same time, to the demands of services and needs of the neighbors of the whole area of Palma-Palmilla. Two studies are developed: (a) an analysis of the data and documentation provided by the Municipal Housing Institute, and (b) a series of structured interviews with the most representative public and social agents. These two studies draw some conclusions concerning the occupants of the building, such as the lack of roots, their precarious socioeconomic situation, a situation of illegal occupation of the houses (controlled by a group of gypsy families), the lack of relationships among the different cultures and races (“payos”, gypsies, and different nationalities).

In the neighborhood scale, a diagnosis that has been made show the important and negative perception that Palma-Palmilla’s community has towards this building, a symbol of social marginality in the whole area. Therefore, after the public administration has intervened several times to renovate the building and fail to achieve an adequate and necessary further maintenance, it should be convenient the search for a model of alternative uses of the building that does not perpetuate the current delicate situation. Likewise, legal and housing needs of occupants should be covered.

4.2 Approach to different hybrid models in the building for the provision of social services, facilities and housing services.

The project proposes the transformation of the residential building into a hybrid building based on the mix of uses: public spaces, housing, work, leisure and cultural activities. The hybridization of different activities or functions is a system in which the various uses are fed back to the interconnection

between them. It is a highly recommended solution in dense environments and with limitations for the occupation of the land, for its revitalizing functions. A hybrid building is characterized by the mixture of different programs, promoters, managements and, of course, different profiles of users. A hybrid can be just as diverse as a neighborhood or city at the level of programs, usage times, rhythms, types of users, etcetera.

With the aim of exploring a new model of alternative uses, a study is carried out to identify the demands and social needs of the residents of La Palma-Palmilla area. From this information, it has been made a proposal of two alternative programs (different social services and housing services), both in compliance with the restrictions contained in the General Urban Planning Plan and sectoral regulations. The result of this study enhances the need of housing services and, as well as a social renovation project.

The housing services have traditionally been offered by the administration through the public rental housing, especially for those with less economic resources. This project incorporates the establishment of micro-communities of self-management under the supervision of the local administration. This allows incorporating a series of social benefits according to the degree of need and integration that the residents wish to establish. In vulnerable social environments, the micro-communities can be created bottom-up or organized in a tutored way around groups of interests or social needs, as is the case of sheltered housing, with external technical support.

In specific terms, it is proposed to replace the current failed model of private housing to incorporate a model of housing services, from an optional day center, sheltered housing for elderly people, residence, temporary housing and rent managed by the city council as guarantor of the later mandatory maintenance of the building (with the possibility of incorporating NGOs and other members of the district community). See figure 1.

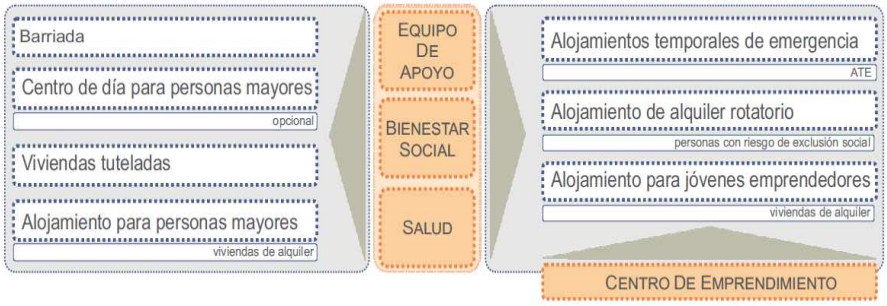

Figure 1. Scheme of the model of provision of housing services

In relation with the idea of incorporating a model of social renovation, the project should facilitate the creation of a system of social-based enterprises or cooperatives that fosters entrepreneurship and participate actively in the renovation and maintenance of the neighborhood itself. See figure 2.

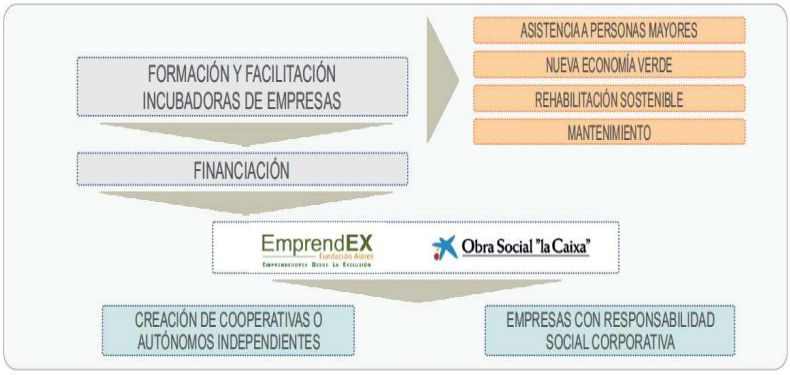

Figure 2. Scheme of social renovation project.

4.3 Guidance and strategies for Integrated Regeneration.
A series of strategies are proposed with the aim of transforming the image of the building and make it a new identity element in the neighborhood. The starting point of this renovation process is the transformation of uses: from the residential use of private homes to a new hybrid model that combines public - sociocultural and productive uses - and housing in different modalities (the various housing services).

The process of transformation is conducted in a holistic and integrated way, attending not only to its functional character, but also to other aspects that will reinforce the new identity of the building, its physical and social renovation. This physical renovation will contribute to change its image and, at the same time, will allow the development of strategies for the improvement of the energy performance of the building. Strategies are grouped into three blocks:

4.3.1. Physical transformation of the building.
Some of the proposed strategies include the creation of exterior spaces in different floors of the building as new public spaces or “squares in height” within the building. This strategy would transform the current image of the building through small demolitions and organize new services and facilities around them. Another strategy is to partially leave the ground floor opened to the public space in order to enhance the relationship between the building and the outer space of the neighborhood. The public space around the area becomes a new space of opportunity and centrality within the neighborhood.

4.3.2. Transformation of building uses (and social transformation).
New public uses are proposed for the neighborhood with residential accommodation and community facilities. A hybrid program proposal as a step prior to the specific definition of the program by the administrations and social services. The incorporation of the new uses requires the adaptation of the building to the sectorial regulation of each of the new services as the inclusion of a new nucleus of communications and adaptation of the existing one. The articulation of these new services of community facilities and residential uses is made around the exterior spaces in the different levels, promoting the relationship between different types of occupants. The deck plant also becomes a new place of meetings and place for the use of residents.

4.3.3. Strategies for improving the energy performance of the building.
It is necessary to minimize the energy demand for achieving a building of almost zero consumption, and at the same time, to maximize energy production with renewable sources. The strategies include the incorporation of passive systems, such as the orientation and distribution of new uses according to solar conditions (residential and high-rise squares on southeast and southwest facades, and classrooms,

workshops, communications centers and facilities on the north-west façade), or promoting a good ventilation of the rooms. In addition, it will be possible to incorporate different active systems of energy supply that allow to partially meet the demands of energy consumption, such as solar panels on the roof and façade, or the incorporation of a system of wind turbines on deck, to be evaluated in the drafting phase of the project.

5. Conclusions

Beyond the results of the different specific proposals extracted from the research, we want to focus the interest of this work in several aspects. On the one hand, from a more methodological point of view, the importance given to basic technical studies, in particular to the study of social problems and demands, not only within the building but also in the neighborhood. Programs and social guidance should conduct physical interventions and functional transformations. The physical improvement of the environment does not work but accompanied by a social project. This is shown in the different previous actions of renovation of the building, all of them failed. The Integrated Urban Regeneration requires an integrated methodological practice, which implies previous base studies and development from different approaches: from the urban, architectural, social, economic (or productive) and environmental perspective. A holistic vision has to be included throughout the process in all its phases, as required in this project.

The objectives set at the beginning of the research are made from the consideration of the building as a project of urban regeneration for the whole neighborhood. In this situation, another of the values of the research project is highlighted: the incorporation of the urban scale in all its phases, from previous urban and social studies, which serve the community of the neighborhood, to the formulation of new hybrid models based on existing demands in La Palma Palmilla area. This condition of the property as a new hybrid facility for the whole neighborhood make it a new place of centrality. Furthermore, the new hybrid model does not only solve the conflict caused by the building nowdays but it turns into a new space of opportunity and identity.

6. Acknowledgment(s)

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